LEAGUE OF NATIONS

Health Organisation

REPORT

on the

PHYSIOLOGICAL BASES

of

NUTRITION

by the Technical Commission
appointed by the Health Committee

(Meeting held in London, November 25th-29th, 1935.)

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INTRODUCTION

For ten years, the Health Organisation of the League has been engaged in the study of nutrition in relation to public health. The following have been the main stages of the work:

In 1925, upon the proposal of the Yugoslav delegation, the Assembly (sixth session) requested the Health Committee to study " the methods to be recommended in the interests of public health for the regulation of the manufacture and of the sale of food products."

In October 1928, at the thirteenth session of the Health Committee, Professor Léon Bernard asked, on behalf of the French Government, for nutrition to be placed on the programme of work of the Committee.

In 1926, the Health Section published a collection of memoranda on the physiology of nutrition and its applications by Professor T. Saiki, Director of the Imperial Institute of Nutrition of Tokyo, and his assistants (" Progress of the Science of Nutrition in Japan ", document C.H.523).

In 1927, Professor T. Saiki, under the auspices of the Health Organisation, gave a series of lectures on nutrition in the United States of America, Argentine, Brazil and Chile. The same year, the Chief of the Department of Applied Science in the Institute of Tokyo came to study problems of nutrition in the United Kingdom with Professor Mellanby, and afterwards in different institutes and laboratories of Europe.

In 1926-27, the Health Section arranged for the visit of the late Professor Egerton Grey of the University of Cairo to the Tokyo Institute, and published in 1928 his valuable report entitled " The Food of Japan " (document C.H.861).

In 1931, the Health Committee organised a collective tour to study the supply of milk in the United States. Two of the participants, Professor R. Burri and Dr. G. S. Wilson, summarised their observations in memoranda published in the *Quarterly Bulletin of the Health Organisation*, Vol. I, Nos. 1 and 4. At the same time, the hygiene of milk was studied by Professor J. Parisot in the Department of Meurthe-et-Moselle (*Quarterly Bulletin*, Vol. III, No. 4).

In 1932, the Government of Chile requested the collaboration of the League of Nations in a study of popular nutrition in that country. The preliminary studies led to a double enquiry—economic and medical—which was begun in 1935.

In October 1932, at its nineteenth session, the Health Committee decided to undertake the study of the effects of the economic crisis on public health, with particular reference to conditions of under-nutrition produced by the crisis. In the *Quarterly Bulletin* was published in 1933 a study by Dr. Mackenzie on the administrative machinery by which the nourishment of the poor is assured in the United Kingdom (Vol. II, No. 2) and a study by Dr. W. R. Aykroyd on " Diet in relation to Small Incomes " (Vol. II, Nos. 1 and 2).

In 1932, two Conferences of Experts were convened in connection with the studies on nutrition. They did not only deal with the conditions brought about by the economic crisis, they also considered the fundamental data of the problem and dealt with the principles of an adequate diet.

(*a*) The Conference of Experts at Rome (September 1932) considered the question of dietary standards and drew up a scale of family co-efficients for inter-

national use in order that the enquiries on the state of nutrition in various countries might be made comparable.

(*b*) The Conference of Experts in Berlin in December 1932 considered the physical standards and the clinical and physiological methods best calculated to detect states of malnutrition.

The reports of these two Conferences were published in the *Quarterly Bulletin*, Volume I, No. 3, and Volume II, No. 1. They may be considered precursors to the report of the London Conference which is published hereafter.

* * *

In 1934, in view of this work and of all the documentation collected, the Health Committee, when drawing up its three-year programme of work, decided that a general report on nutrition should be made (see document C.233.M.97.1934, page 12). The preparation of this report was entrusted to Dr. E. Burnet and Dr. W. R. Aykroyd, who carried out a series of enquiries in different countries (United Kingdom, France, United States, Denmark, Sweden, Norway, and the U.S.S.R.) on the special institutions of nutrition policies of these countries. This report was drawn up in the early part of 1935, and published in the *Quarterly Bulletin* (Vol. IV, No. 2, June 1935).

This report, which was specially intended for health administrations, deals with the position of nutrition in public health and preventive medicine.

Nutrition in relation to health is one of the most important aspects of preventive medicine, and the recent progress in the science of nutrition makes it essential for public health to develop along new lines.

Nutrition is put forward, not only as a physiological problem, but also as an economic—agricultural, industrial and commercial—problem.

Health workers are appealing to the economists for the realisation of their plans. Economists beginning to be guided by the lofty aims of preventive medicine. The time will soon be over when commercial agreements and Customs measures are applied without consideration for the requirements of the masses and of public health.

The plan indicated by the table of contents at the beginning of the report appears at first sight to be somewhat complicated. In reality it is very simple and hinges upon three main questions:

(1) *What are the nutritional needs of the human being ? How can they be recognised ? How can it be determined whether they are being satisfied ?* (Dietary standards and physical standards.)

(2) *What resources are available to meet nutritional requirements ?* (Food available; production; distribution; preservation.)

One chapter emphasises the relationship between nutrition and economy, based on examples taken with respect to four fundamental foods of great importance; meat, milk, bread and fats.

(3) *How best to utilise the resources available in order to meet these requirements ;*

Nutrition has already been recognised as a means of protecting maternity and childhood, of controlling the deficiency diseases (rickets, dental caries, anæmia,

S.d.N. 1330 (F.) 1425 (A.) 12/35. Imp. Kundig.

pellagra, beri-beri) and of ensuring the regular development of the human being in its various surroundings; in the urban centres, rural districts, or the colonies.

Certain countries, as, for example, the U.S.S.R., have already organised extensive public or collective nutrition, including preventive or curative diets.

In order to formulate adequate *diets*, it is necessary first to consider the various nutritional types.

It is no longer necessary to consider whether Governments should intervene in connection with nutrition because in point of fact such intervention has existed for a considerable time. The report gives examples of organised nutrition.

The report not only does not omit, but rather emphasises on each page, the economic conditions in relation to adequate nutrition. It concludes with this statement: " Production, distribution and consumption have hitherto been considered mainly as economic problems without sufficient regard to their effect on public health, but the effect of the economic depression has directed attention to the gap which almost everywhere exists between dietary needs as determined by physiology and the means of satisfying them under existing conditions. *The general problem of nutrition as it presents itself to-day is that of harmonising economic and public health development.*"

In another part of the report (see Chapter on Nutrition and Poverty), the authors have not overlooked the psychological aspect of the question. If salaries are, so to speak, the " iron law " in regard to nutrition, it is not sufficient to increase them in order to do away with all nutritional deficiencies which accompany poverty; it is also necessary (and not only amongst the poor) to develop *education :* education of medical men, of health workers, of mothers, and of the whole population from infancy upwards; the education of those engaged in teaching the public, and the education of the public itself.

The report by Drs. Burnet and Aykroyd was published at a time when the social problems of housing and nutrition were definitely occupying the foremost position in public health. Continuing the work carried out by the Rome and Berlin Conferences, it thereby met the preoccupations arising out of the protracted economic depression. It contained the essential elements for a general discussion of the practical problems of nutrition in relation both to public health and to economic recovery. It was therefore natural that it should be used as a basis of discussion when the delegations of twelve Governments at the sixteenth Assembly of the League (September 1935) requested that nutrition should be placed on the agenda.

The discussion in the Second Committee of the Assembly was introduced by Mr. Bruce (Australian delegate), who stressed the necessity for marrying agriculture and public health in the interests of the latter; of increasing the consumption of protective foods as a remedy for malnutrition and the agricultural crisis, and of changing the incidence of State protective subsidies so that they should serve to increase consumption rather than to restrict production. He pointed out the necessity for reducing the wide gap between wholesale and retail prices and of reducing the costs of distribution.

The following points emerged from the discussion:

(*i*) An increase of production supplies the Governments with further means for improving public health;

(*ii*) This can be done by expanding the work that they have already begun in the field of nutrition;

(*iii*) This constitutes a direct and practical means of attacking the problem of agricultural surpluses and the consequent fall in prices.

On consideration of the report of Lord De La Warr (United Kingdom), the Assembly adopted the following resolution:

" The Assembly,

" Having considered the subject of nutrition in relation to public health and of the effects of improved nutrition on the consumption of agricultural products, urges Governments to examine the practical means of securing better nutrition and requests the Council:

" (1) To invite the Health Organisation of the League of Nations to continue and extend its work on nutrition in relation to public health;

" (2) To instruct the technical organisations of the League of Nations, in consultation with the International Labour Office and the International Institute of Agriculture, to collect, summarise and publish information on the measures taken in all countries for securing improved nutrition and,

" (3) To appoint a Committee, including agricultural, economic and health experts, instructed to submit a general report on the whole question, in its health and economic aspects, to the next Assembly, after taking into consideration, *inter alia*, the progress of the work carried out in accordance with paragraphs (1) and (2) above."

* * *

At the same time, the International Labour Office, which had been informed of the general plan of the Burnet-Aykroyd report, had given proof of its interest in the report. The Mixed Advisory Agricultural Committee (which ensures liaison between the International Labour Office and the International Agricultural Institute of Rome), the International Committee for Inter-co-operative Relations (which is a private organisation for liaison between agricultural and consumers' co-operatives, under the chairmanship of the Director of the International Labour Office), had expressed their desire to co-operate in studying the question of the nutrition of workers. When the nineteenth International Labour Conference was held in June 1935, its attention was drawn to the problems of nutrition in the report by the Director of the International Labour Office, and by statements by Sir Frederick Stewart, Miss Paterson and Miss Grace Abbot (Government

delegates of Australia, New Zealand and the United States of America. The following resolution was unanimously adopted:

" Seeing that nutrition adequate both in quantity and in quality is essential to the health and well-being of the workers and their families;

" And seeing that, in various countries, evidence has been brought forward to show that large numbers of persons both in town and country are not sufficiently or suitably nourished:

" Seeing, moreover, that an increase in the consumption of agricultural foodstuffs would help to raise standards of life and relieve the existing depression in agriculture:

" The Conference welcomes the attention drawn by the Director in his report to the problem of nutrition and requests the Governing Body to instruct the Office to continue its investigation of the problem, particularly in its social aspects, in collaboration with the Health and Economic Organisations of the League of Nations, the International Institute of Agriculture and other bodies capable of contributing to its solution, with a view to presenting a report on the subject to the 1936 session of the Conference."

* * *

At its twenty-second session (October 1935), the Health Committee considered the report by Drs. Burnet and Aykroyd and specifically discussed the hygienic aspects of the problem. It was decided that members of the Committee should forward and recommend the report to their national administrations. After having stressed the necessity for educating medical practitioners, public health workers and the public in the field of nutrition, the Health Committee adopted the following resolution:

" The Health Committee,

" Being of opinion that these studies may be a useful contribution to public health progress, and would be the logical development of its former activities in this field:

" Requests the Bureau to constitute an expert committee of twelve members at most, with the following terms of office:

" (1) To consider the suggestions contained in the Health Organisation's report, or formulated when this report was examined by the Health Committee and during the Assembly discussions on the matter (document A.61.1935);

" (2) To select such questions of practical importance as might usefully be studied internationally and to classify them by order of priority;

" (3) To submit a first report to the Co-ordination Committee set up in accordance with the third paragraph of the Assembly resolution of September 25th, 1935. This report would be the basis for the work to be carried out in co-operation by the technical organisations and international institutions mentioned in the above resolution."

* * *

In accordance with this resolution, a list of questions for investigation, arranged in order of priority, was drawn up on the basis of the report for submission to the Commission of Experts.

The discussions of the Assembly and of the Health Committee made it appear that health experts were to be asked to take the first step by defining the nutritional needs of the human being in the course of its development from conception to the adult age —*i.e.*, the physiological basis for adequate nutrition. It would then be the duty of the Health Organisation and of the other technical organisations, to consider the appropriate means for their practical application.

The Commission of Experts appointed by the Health Committee was composed as follows:

Austria.

Professor A. DURIG, [1] Professor of Physiology at Vienna University.

United Kingdom.

Professor E. P. CATHCART, Professor of Physiology, Glasgow University;
Professor E. MELLANBY, Secretary-General of the Medical Research Council, Professor of Physiology at the Royal Institution, London;
Sir John BOYD ORR, Director of the Imperial Bureau of Animal Nutrition, Reid Library, Rowett Institute, Aberdeen.

United States of America.

Professor E. V. MCCOLLUM, Professor of Biochemistry, Johns Hopkins University, Baltimore;
Dr. Mary SWARTZ ROSE, Columbia University, New York;
Dr. W. SEBRELL, Chief of the Department of Nutrition, National Institute of Hygiene, Washington, D.C.

France.

M. J. ALQUIER, Secrétaire général de l'Institut scientifique d'hygiène alimentaire, Directeur de l'Institut national agronomique, Paris;
Professor L. LAPICQUE, Professor of Physiology at the University of Paris, Faculté des sciences, Sorbonne, Paris.

Scandinavian States.

Professor Axel HÖJER, Generaldirektor, Medicinalstyrelsen, Stockholm;
Professor C. SCHIOTZ,[1] Professor of Hygiene at the University of Oslo.

U.S.S.R.

Professor B. SBARSKY, Director of the Central Nutrition Institute, Moscow.

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[1] Unable to attend the first meeting of the Commission (November 25th-29th, 1935).

The Commission of Experts held its first meeting in London at the School of Hygiene and Tropical Medicine from November 25th to 29th, 1935, under the chairmanship of Dr. E. Mellanby. The outcome of its discussions was the following report. This is only the first phase of the Commission's work. Its conclusions contain a brief outline of further studies.

In order that this report as adopted may be followed by suitable action, the following arrangements have been made:

(1) In accordance with the third paragraph of the Health Committee's resolution, the report will be forwarded to the " Mixed Committee for the Study of the Problem of Nutrition ", which was appointed by the Council of the League in accordance with the third paragraph of the Assembly resolution of September 25th, 1925 (see above, page 6).

(2) Since the general principles as laid down in the report are to be applied in different countries and should therefore be adapted to varying conditions of population, customs and social life, the Commission decided that its report should be communicated for study to representative scientific institutions of different countries, who in their turn should collect advice from technical experts who are concerned with the various aspects of nutrition, as clinicians, pediatricians, school medical officers, public health officers, etc.:

In the United Kingdom—the Medical Research Council;
In the United States of America—the National Research Council;
In France—the Academy of Medicine;
In the Netherlands—the Academy of Science;
In Spain—the National Academy of Medicine;
In the U.S.S.R.—the Scientific Research Council;
For the Scandinavian countries and for Belgium, a similar institution.

This advice will be analysed and summarised by the Commission, and form a supplementary report to be also forwarded to the " Mixed Committee for the Study of the Problem of Nutrition " (appointed by the League Council).

The following report, when thus supplemented, would be " the basis for the work to be carried out in co-operation with the technical organisations of the League of Nations and other international institutions " mentioned in the Assembly resolution.

REPORT

of the

Technical Commission of the Health Committee

INTRODUCTION.

The Commission is in agreement with the conclusions of the Burnet and Aykroyd Report that deficiencies in important nutrients are a common feature of modern diets and that these deficiencies usually occur in the protective foods (foods rich in minerals and vitamins) rather than in the energy-giving foods (proteins, fats and carbohydrates). The Commission has set out its findings in two parts: Part I dealing with the requirements of energy-giving foods; Part II with mineral and vitamin requirements.

PART I.

ENERGY, PROTEIN AND FAT REQUIREMENTS.

1. Calorie Requirements.

(*a*) An adult, male or female, living an ordinary everyday life in a temperate climate and not engaged in manual work is taken as the basis on which the needs of other age-groups are reckoned. An allowance of 2,400 calories net per day is considered adequate to meet the requirements of such an individual.

(*b*) The following supplements for muscular activity should be added to the basic requirements in (*a*):

Light work:	up to	50	calories per hour of work,
Moderate work:	,,	50-100	,, ,,
Hard work:	,,	100-200	,, ,,
Very hard work:	,,	200 calories and upwards per hour of work.	

(*c*) The energy requirements for other ages and for mothers can be obtained from the following table of coefficients:

Age (years)	Coefficient	Calories
1-2	0.3	720
2-3	0.4	960
3-5	0.5	1,200
5-7	0.6	1,440
7-9	0.7	1,680
9-11	0.8	1,920
11-12	0.9	2,160
12 and upwards . . . (male and female)	1.0	2,400
Women:		
Pregnant	1.0	2,400
Nursing	1.25	3,000

The requirements for babies under 1 year are difficult to specify except in terms of body-weight, but the following allowances are considered adequate:

Age (months)	Calories per kilogramme of body-weight
0-3	100
3-6	90
6-12	80-90

The muscular activities characteristic of every healthy child and adolescent necessitate additions to the basic requirements shown in (*c*). It is suggested that the activities of children of both sexes from 7-11 years be considered as equivalent to light work, of boys from 11-15 years as moderate work and of girls from 11-15 upwards as light work.

Allowance must also be made for women engaged in household duties, whether pregnant or not; these have to be reckoned as equivalent to light work for eight hours daily.

2. Protein Requirements.

In practice, the protein intake for all adults should not fall below 1 gramme of protein per kilogramme of body-weight. The protein should be derived from a variety of sources, and it is desirable that a part of the protein should be of animal origin.

During growth, pregnancy and lactation, some animal protein is essential, and in the growing period it should form a large proportion of the total protein.

The following allowances of total protein are recommended:

Age (years)	Grammes per kilogramme of body-weight
1-3	3.5
3-5	3.0
5-15	2.5
15-17	2.0
17-21	1.5
21 and upwards	1.0
Women:	
Pregnant	2.0
Nursing	2.0

3. All the above figures on which the Commission has agreed are average values and it is essential that they should be interpreted in the light of this fact.

4. Fat Requirements.

Fat must be a constituent of the normal diet, but the data at present available do not suffice to permit a precise statement of the quantity required.

5. The Influence of Climate on Dietary Requirements.

In cold climates, the energy-content of the diet should be increased.

PART II.

MINERAL AND VITAMIN REQUIREMENTS.

6. The Commission recognises the fact that the deficiencies of modern diets are usually in the p r o t e c t i v e f o o d s (foods rich in minerals and vitamins) rather than in more strictly e n e r g y - b e a r i n g f o o d s (rich in calories). Among the former are, first and most important, milk and milk products, eggs and glandular tissues; then green-leaf vegetables, fruit, fat fish and meat (muscle). Among the energy-bearing foods of little or no protective power are sugar, milled cereals and certain fats.

Of energy-giving foods, unmilled cereals are not rich in protective nutrients and the more they are refined the less is their protective power. Many fats, especially when refined, possess little or no protective constituents. Refined sugar is of value only as a source of energy; it is entirely devoid of minerals and vitamins. The increasing habit of large sugar consumption tends to lessen the amount of protective foods in the diet and is to be regarded with concern.

7. Requirements of Pregnancy and Lactation.

The Commission has attempted to define the quantitative needs of protective foods for perfect nutrition in terms of the requirements for the pregnant and nursing woman. She should be regarded as the member of the population needing the greatest "protection" in order to ensure adequate physical endowment for the child at birth and optimum nutrition during infancy.

The greatest difficulty in arranging such a diet is to provide adequate calcium, phosphorus, iron and vitamins B_1, B_2, C and D.

8. Milk, whole or skimmed, is a rich source of calcium salts and phosphates and of vitamin B_2, also a good source of vitamin B_1; milk fat is an excellent source of vitamin A. Eggs contain vitamins A, B_1, B_2 and D and are rich in iron. The proteins of these foods

are not only themselves of the highest nutritive value, but also improve the utilisation of the protein contained in cereals and vegetables. Milk has an additional advantage in the abundance and availability of its calcium salts and phosphates; these enhance the effect of any vitamin D derived from other articles of diet or from sunshine. Milk, although itself poor in iron, renders more effective the iron contained in the diet.

9. Ordinary diets are usually inadequate in vitamin D and, except in sunny seasons and sunny countries, a small daily ration of cod-liver oil is to be recommended in the diet of the pregnant and nursing mother and in that of the growing child. Fish-liver oils are the richest known natural sources of vitamin A and are also important sources of iodine. In goitrous regions, where sea-fish are not available, the provision of extra iodine in the form of iodised salt or in some other way is recommended.

10. An extended dietary use of the potato is recommended to replace part of the sugar and highly milled cereals in the ordinary diet. Potatoes provide extra vitamin C and more readily available calcium and phosphorus than are present in cereals. Potatoes also yield more iron and B vitamins than milled cereals.

The above paragraph applies to countries where potatoes are abundant, but it is of general application, due account being taken of local resources.

11. Requirements of Other Adults and Children.

Tables I, II, III and IV contain details of specimen diets derived from investigations made in Great Britain, the United States and Scandinavian countries, considered satisfactory for a pregnant or nursing woman and for infants and children of ages up to 5 years. They are put forward as models which could be modified in many particulars according to national dietary habits and supplies, provided that the dietary principles contained in them are duly regarded.

The protective foods in Table I are arranged to yield approximately 1,400 calories without inclusion of cereals, fats or sugar; these can be added as required to satisfy the energy requirements of any individual. For adults other than the pregnant and nursing

woman, the amount of protective foods might be reduced, if necessary, for economic reasons. For growing children, however, the maintenance of a high proportion of protective foods should be the aim.

In Tables II, III and IV, specimen diets are drawn up on the above basis for age-groups 0-1, 1-2, 2-3 and 3-5 years. Since the rate of growth of a child decreases with advancing age, approximately the same amount of the protective foods will suffice for 10-15-year-old children as is required for the 5-year-old child.

12. General Recommendations.

A. Although a simplified diet may be so constituted from a few protective foods as to be satisfactory, it is a general principle that variety in diet tends to safety, provided it contains a sufficiency of the protective types of food materials.

B. White flour in the process of milling is deprived of important nutritive elements. Its use should be decreased and partial substitution by lightly milled cereals and especially by potatoes is recommended. The consumption of an excessive amount of sugar is to be condemned, and in this case also partial replacement by potatoes is urged.

C. Milk should form a conspicuous element of the diet at all ages. The Commission commends the tendency manifested in some countries to increase the daily intake up to one litre per day for pregnant and nursing women, as well as to provide an abundant supply for infants, children of all ages and adolescents. The practice of providing milk either free or at a reduced price to these is highly recommended.

The Commission desires to draw attention to the high nutritive value of skimmed and separated milk, which, although deprived of its vitamin A through removal of the fat, retains the protein, the B and C vitamins, the calcium and other mineral elements. The Commission deplores the large wastage in many countries of this valuable food.

D. Fresh vegetables and/or fruit should always be constituents of the normal mixed diet. Adequate provision of the vitamins other than vitamin D can be readily accomplished by inclusion in the diet of optimum amounts of protective foods. Where these are not available, only such vitamin preparations as are officially controlled and approved should be permitted.

E. The Commission emphasises the need for provision of extra vitamin D, either as cod-liver oil or as irradiated products, wherever and whenever sunshine is not abundant, especially in the period of growth and during pregnancy.

13. Problems recommended for Further Study.

A. Assessment of the nutritional state of children.

B. Nutritive food requirements during the first year of life.

C. Minimum vitamin and mineral requirements.

D. Minimum fat requirements.

E. The nutritive and "supplementary" values of the different protein-containing foods, to determine to what extent and in what forms animal protein is necessary for growth and health.

F. The relative nutritive value of different cereals according to the degree of milling.

G. The extent to which the increasing consumption of sugar is detrimental to health.

H. Influence of climate on food requirements.

I. The extent to which diets in common use fall below the standards recommended in this Report.

TAB

DIETARY SCHEDULE FOR TH

A. Protective Foods.

Food	Amount	Calcium	Phosphorus	Iron	Iodine
	Grammes			Milligrammes	
MILK	1,000	1.2	0.9	2.4	0.02-0.
MEAT (or fish or poultry)	120(*a*)	—	0.3	$\frac{3.0}{2}(a_1)$	
EGGS (one)	50	—	0.1	1.4	
CHEESE (Cheddar)	30	0.3	0.2	0.4	
Green and Leafy VEGETABLES	100(*d*)	0.5	—	1.0	
POTATOES	250	—	0.2	3.0	
LEGUMES, Dried	10(*e*)	—	—	2.0	
COD-LIVER OIL	3.5	—	—	—	Riches sourc
An available source of Vitamin C (from raw fruits and vegetables)					
Total yield		2.0	1.7	11.7	Adequa

B. Supplementary energy-yielding foods by means of which the individua

CEREALS as needed:					
Highly milled	250(*f*)	—	0.2	3.0	
or					
Whole grain	250(*g*)	—	0.9	9.0	
FATS as needed.					
SUGAR as needed.					

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PREGNANT AND NURSING WOMAN.

Vitamin A	Vitamin B_1	Vitamin B_2	Vitamin C	Vitamin D	Calories	Remarks
International Units			International Units			
3,000	50-150	Rich	Poor	Poor	660	(*a*) Calculations for lean meat.
Poor	Poor (*b*)	Rich	Poor	None	260	(a_1) One-half calculated as available iron.
1,300	14	Rich	None	40(*c*)	70	(*b*) Except glands (liver and kidney) and pork muscle.
800	Poor	Good	Poor	Poor	125	
100	25 (raw)	Good	300 (raw)	None	30	(*c*) 12 eggs equivalent to 3.5 gms. cod-liver oil.
Poor	50	Good	320 (cooked)	None	250	(*d*) Estimated on basis of cabbage as type.
Poor	15	Good	None	None	35	(*e*) Calculated as beans.
3,500	None	None	None	300	30	
			250-500			
8,700	154-254	Adequate	870-1,120	340	1,460	

energy requirements can be met.

					1,000	(*f*) Calculated as white flour.
	270				1,000	(*g*) Calculated as whole wheat.

TABLE II.

INFANTS.

Age 0-1.

Breast-feeding is strongly recommended during the first nine months of life. Where and when sunshine is not abundant, each breast-fed infant should receive a small daily ration of cod-liver oil, up to 6 grammes daily, to supply the antirachitic vitamin D. This is even more important for artificially fed infants. Fresh fruit and/or vegetable juice to provide antiscorbutic vitamin C should also be given to every infant, especially the artificially fed.

When breast-feeding is not possible, the basis of the infant's diet should be milk, suitably modified if necessary, and supplemented by an adequate amount of substances rich in vitamins A, C and D.

Where complete breast-feeding is impracticable, partial breast-feeding is urged, and the supplementary diet should consist of cow's milk and other suitable protective foods.

Age 1-2 (1,000 calories).

Food	Amount (grammes)	Calories	Protein (grammes)
A. Protective Foods.			
MILK	1,000	660	32
1 EGG (or equivalent, as 30 grammes meat or fish or liver, if available)	48	70	6
Green leafy VEGETABLES	30-60	15	—
POTATO (and other root vegetables)	50	50	1
COD-LIVER OIL	3	30	—
A source of vitamin C (raw vegetable or fruit)			
		825	39
B. Supplementary Energy-yielding Foods.			
FATS (butter if possible)	3.5	25	—
CEREALS (as wheat)	50	150	7
Total		1,000	46

TABLE III.

Age 2-3 (1,200 to 1,300 calories).

Food	Amount (grammes)	Calories	Protein (grammes)
A. Protective Foods.			
MILK	1,000	660	32
1 EGG (or equivalent, as 30 grammes meat or fish or liver if available)	48	70	6
Green leafy VEGETABLES	60-100	20	2
POTATO (and other root vegetables)	100	100	2
COD-LIVER OIL	3	30	—
A source of vitamin C (raw vegetable and fruit)			
		880	42
B. Supplementary Energy-yielding Foods.			
FAT (butter if possible)	3.5	25	—
CEREALS (as bread)	100	300	14
Total		1,205	56

TABLE IV.

Age 3-5 (1,400 calories).

Food	Amount (grammes)	Calories	Protein (grammes)
A. Protective Foods.			
MILK	1,000	660	32
EGG	48	70	6
MEAT, FISH or LIVER	30	40	6
Green leafy VEGETABLES	100	30	3
POTATO	150	150	3
COD-LIVER OIL	3	30	—
A source of vitamin C (raw vegetable or fruit)			
		980	50
B. Supplementary Energy-yielding Foods.			
FATS, butter if possible	7	55	—
CEREALS (as bread)	125	400	17
Total		1,435	67